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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/802,654	03/08/2001	Tranh To Nguyen		7519

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TRANH NGUYEN  
1552 MAGNOLIA AVE.  
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EXAMINER

SHINGLETON, MICHAEL B

ART UNIT PAPER NUMBER

2817

DATE MAILED: 06/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/802,654	Applicant(s) NGUYEN, TRANH TO	
	Examiner Michael B. Shingleton	Art Unit 2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 21-39 ☒ are pending in the application.
- 4a) Of the above claim(s) 25-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-24 and 39 ☒ are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

*Specification*

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The examiner cannot find proper antecedent basis for the claimed “first switching power converter” and the “second switching power converter”. Because of the lack of proper antecedent basis it is unclear as to whether this is to be directed to the power modulator 12 or to the synchronous demodulator 16. Accordingly, the examiner has applied the usual and common meanings for these terms.

*Election/Restrictions*

Applicant's election of Species VII, directed towards Figures 11 and 11B in the reply filed on 12-08-2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Applicant believes that all the claims, new claims 21-39, read on the elected invention. Claims 1-20 have been cancelled. The examiner respectfully disagrees. For example claim 25 recites that the transformer is an auto-transformer, however, the transformers of both the Figures 11 and 11B embodiments are definitely not auto-transformers. Auto-transformer embodiments are clearly subject to the non-elected invention. Accordingly, claim 25 is withdrawn from consideration. Additionally, claims 30-38 also are not directed to the elected invention for independent claim 30 requires that the controller be “for receiving a reference input signal and a feedback signal to produce digital signals controlling the operation of the power modulator and the synchronous demodulator”. Claims 31-38 because of their dependency directly or indirectly on Claim 30 also requires such a controller. The controllers “26” of Figures 11 and 11B do not have such a structure that includes a reference input and a feedback signal input. In fact the reference signal and the feedback signal as claimed does not appear anywhere in the elected invention as shown in Figures 11 and 11B. Accordingly, claims 30-38 are withdrawn from consideration. It is important to note that another reason why claims 30-38 are not directed to the elected invention is that these claims are directed to an invention never before presented. The original disclosure does not give enough information necessary for one to make the invention of claims 30-38 without undue experimentation and this invention does not appear to even find support in the original disclosure. In fact page 7 of the original disclosure recites that “controller 26 is a non-linear controller and it is outside the scope of this patent application” and thus the specifics of the controller even if supported by an original disclosure cannot be subject to the elected invention for it is “outside the scope of this patent application” (Emphasis added). Claim 28 recites that the pulsing power converter having two bi-directional switches wherein one is coupling the primary side of the transformer to the DC supply and the other switch

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selectively couples the secondary side of the transformer to the H-bridge. The elected invention has both of these switches on the primary side and therefore this claim 28 is not directed to the elected invention. Accordingly, claim 28 is withdrawn from consideration. Also note that since claim 29 is dependent upon claim 28 that this claim is directed to the non-elected invention as well and is withdrawn from consideration. In the interest of compact prosecution, it is important to note that claim 29 refers to "the bi-directional switch" but there are at least six bi-directional switches recited in the base claims for claim 29 making it unclear which bi-directional switch this claim refers too. Claims 26 and 27 are also directed to the non-elected invention contrary to applicant's beliefs. Here claims 26 and 27 recite that the PWM controller is for controlling the operation of the switches of the pulsing power converter and the H-bridge according to the amplitude and polarity of the reference input signal and according to the amplitude of the DC supply (Emphasis added.). The controllers "26" of Figures 11 and 11B do not have such a structure. It is important to note that another reason why claims 26-29 are not directed to the elected invention is that these claims are directed to an invention never before presented. The original disclosure does not give enough information necessary for one to make the invention of claims 26-29 without undue experimentation and this invention does not appear to even find support in the original disclosure. In fact page 7 of the original disclosure recites that "controller 26 is a non-linear controller and it is outside the scope of this patent application" and thus the specifics of the controller even if supported by an original disclosure cannot be subject to the elected invention for it is "outside the scope of this patent application" (Emphasis added). Accordingly, claims 26-29 are withdrawn from consideration.

### *Double Patenting*

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim 39 is rejected under the judicially created doctrine of obviousness-type patenting as being unpatentable over claims 5-20 of U.S. Patent No. 6,496,059. Although the conflicting claims are not

identical, they are not patentably distinct from each other because the claims of the '059 Patent recites the same basic arrangement as set forth by the instant application's method claim 39. Namely the claims of the '059 Patent sets for the structure that includes the "power modulator, the transformer, and the so called "synchronous demodulator" like that of the method claim 39 of the instant application. The claims of the '059 Patent are silent on specifically mentioning a controller, however, in order for the switches to switch there must be a controller as is conventionally known. This is akin to a claim to a class A transistor amplifier wherein this claim is silent on the biasing of the transistor, but it is common engineering knowledge that a biasing circuit must be present, even though not specifically claimed, in order for the device to work. In the instant case the claimed invention of the '059 Patent must include a controller, i.e. a source of the signals necessary for the switches to switch. Alternatively, given that the use of a controller to provide switch control signals is so conventionally known, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide for a switching controller in the claims of the '059 Patent. Providing a switching controller does not provide for a patentable distinction over the claims of the '059 Patent. As claim 39 of the instant application being a method claim and claims 5-20 being a device claim, the structure claimed in the '059 Patent or made obvious above provides for a method of reducing switching losses by providing the power modulator, the transformer, etc.. This is how the claimed structure of the '059 Patent works and claim 39 of the instant application is in effect a claim of how a structure works. As to the method step concerning the timing of the timing signals, the '059 Patent clearly recites that there is some sort of timing (changing state synchronously) to these timing signals (See claim 6 of the '059 Patent for example). The claims of the '059 Patent are silent as to the timing i.e. the changing state synchronously, being such that this produces zero current switching, however, this is merely the selection of the optimum or workable range. It is common engineering knowledge that one would select the timing so that the switching occurs at zero current for switching at zero current results in the least disruption in current. Switching at non-zero current results in disruption in the current which is common known to cause decreases in efficiency, increases in noise etc. For example, it is a common engineering principle that if the current flow through an inductor is suddenly stopped an increase in voltage would occur  $v = L(di/dt)$ . Clearly, in the invention of the '059 Patent this could lead to noise in the speaker. The fact of the matter is that for these reasons one of ordinary skill would not have switched the invention of the '059 Patent at non-zero current levels. Accordingly, since the selection of the timing is the selection of the result effective variable, i.e. how much noise is produced and determines the efficiency of the arrangement, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the timing of the '059 Patent so

as to switch at zero current. As noted above the fact to switch at non-zero current is well-known to be avoided. Accordingly, having the various control signals timed so that zero current switching occurs does not present a patentable distinction over the claimed invention of the '059 Patent.

Claims 21-24 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 5-20 of U.S. Patent No. 6,496,059 in view of Grant 6,762,645 (Grant) as evidenced by Lincoln 6,072,362 (Lincoln). The claims of the '059 Patent sets forth the same basic structure as is claimed in the instant application except for applicant utilizes different terminology. The first and second switching power converters are seen as representing the switches that make up the claimed demodulator. There is as noted above in the double patenting rejection of claim 39, a pwm controller in the claimed invention of the '059 Patent or at least the providing a controller would have been obvious to one of ordinary skill in the art at the time the invention was made. Applicant is referred to the reasoning above rather which also applies here. Applicant is also referred to the reasoning concerning the zero current switching. The substantive difference between the claimed invention of the '059 Patent and the claims of the instant application lies in the use of four bi-directional switching elements for the demodulator. Note that claims like claim 8 of the '059 Patent set forth the two switches for the power modulator that is connected to the primary of the transformer. Figures like Figure 5 of Grant clearly shows the use of diodes placed in parallel across the switching elements of a H-bridge arrangement. While Grant is silent on this providing the claimed return paths i.e. "switches of the second power converter provide a return path for the first power converter's current to and from the loudspeaker; and when the second power converter is active during the negative portion of the reference input signal, the switches of the first power converter provide a return path for the second power converter's current to and from the loudspeaker", given that this is the same arrangement as applicant (Note Figure 2 for example of the instant application.) and is switched in the common H-bridge manner Grant must provide this function. Grant provides further motivation to make all four of the claimed switches of the H-bridge arrangement of the '059 Patent bidirectional, namely these diodes inhibit "current shoot-through" (See column 4, around line 53.). Lincoln has been cited for it provides support for the recovery of energy in a full bridge arrangement that employs all bidirectional switches, i.e. MOSFETs with diodes connected in parallel there across (Note Figures like 4 and 5). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provide the claimed invention of the '059 Patent with all four switches as bidirectional so as to recover the energy of the loudspeaker and inhibit current shoot-through as taught Grant as evidenced by Lincoln. Making all four of the H-bridge switching elements bi-directional does not present a patentable distinction over the claimed invention of the '059 Patent.

*Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Claims 21-23 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Grant 6,762,645 (Grant).

Figure 3-5 and 8 and the relevant text of Grant discloses a “high efficiency switching amplifier” that amplifies a audio signal. The bidirectional switches Q1-Q4 and D1-D4 or 72, 74, 76 and 78 clearly make up the first and second so called “power converters”. Applicant refers to this structure as composing a “full-bridge converter” (Claims like claim 23) or H-bridge which is clearly illustrated by Grant. These switches are clearly switched with respect to an audio signal that is applied to a pwm controller like the one shown in Figures 3 and 8. Column 5, around line 65 clearly points out that the load can be a loudspeaker which is common known to have positive and negative terminals. Just like applicant’s invention because of the diodes and applicant discloses switching the transistors of the H-bridge in the normal alternative manner, the claimed “controlling the operation of the switches” such that the recited function is obtained in Grant with the claimed return paths for the first and second converters currents to and from the loudspeaker. Grant having exactly the same structure and the H-bridge structure is switched in the same manner as that of applicant these return paths are clearly present in Grant.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21-23 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over King et al. 6,388,514 (King) in view of Grant 6,762,645 (Grant) as evidenced by Lincoln 6,072,362 (Lincoln).

Figures 3 and 4, and the relevant text of King discloses a high efficiency switching amplifier and method for reducing switching losses. The structure of King includes the same basic sections as that of the claimed invention. Namely, King includes a “pulsing power converter” or “power modulator” composed of elements like Q1, a “synchronous demodulator” composed of the half bridge arrangement that includes elements like Q2 and Q3, and a transformer that is switched by the “power modulator” and

is connected to the “synchronous demodulator”. A very important aspect that King has with respect to the claimed invention is the use of a PWM controller like elements 201 and 203 that takes the audio signal in and controls both the power modulator and the synchronous demodulator. The claims recite a first and second switching power converters. This terminology is not used in the specification but is assumed to mean the switches that make up the full-bridge converter or H-bridge arrangement of Figures like Figure 11. King shows a half-bridge in the embodiments of Figures 3 and 4. King, however, states that a full bridge arrangement has the “advantage of not requiring the DC block capacitor C1” (See column 1, around line 45). King shows what a full bridge arrangement would look like in Figure 2 and King provides motivation for modifying the arrangements of Figures 3 and 4 to be a full bridge arrangement as noted above. It does not appear that the pwm controller 101 and 103 of Figure of King has the same input namely the audio signal like that of Figures 3 and 4. Thus it would have been obvious to employ a full bridge arrangement for the half bridge arrangement of Figures 3 and 4 so as to eliminate the “DC block capacitor C1” as taught by King himself. King is silent on whether or not the MOSFETs that would make up this full bridge arrangement are “bi-directional”. It appears that applicant desires these MOSFETs to have diodes connected in parallel with the transistors that make up the full bridge arrangement and it is these diodes in combination with the MOSFETs of the H-bridge arrangement that causes the “switches of the second power converter provide a return path for the first power converter’s current to and from the loudspeaker; and when the second power converter is active during the negative portion of the reference input signal, the switches of the first power converter provide a return path for the second power converter’s current to and from the loudspeaker”. Figures like Figure 5 of Grant clearly shows the use of diodes placed in parallel across the switching elements of a H-bridge arrangement. While Grant is silent on this, providing the claimed return paths, i.e. “switches of the second power converter provide a return path for the first power converter’s current to and from the loudspeaker; and when the second power converter is active during the negative portion of the reference input signal, the switches of the first power converter provide a return path for the second power converter’s current to and from the loudspeaker”, given that this is the same arrangement as applicant (Note Figure 2 for example of the instant application.) and is switched in the common H-bridge manner like that of the instant application, Grant must provide this function. Grant provides further motivation to make all four of the claimed switches of the H-bridge arrangement of the King reference bidirectional, namely these diodes inhibit “current shoot-through” (See column 4, around line 53.). Lincoln has been cited for it provides support for the recovery of energy in a full bridge arrangement that employs all bidirectional switches, i.e. MOSFETs with diodes connected in parallel there across (Note Figures like 4 and 5). Thus it would have been obvious to one of ordinary skill



in the art at the time the invention was made to have provide the claimed invention of the King reference with all four switches as bidirectional so as to recover the energy of the loudspeaker and inhibit current shoot-through as taught Grant as evidenced by Lincoln. King is silent with respect to the timing i.e. the changing state synchronously, being such that this produces zero current switching. This, however, is merely the selection of the optimum or workable range. It is common engineering knowledge that one would select the timing so that the switching occurs at zero current for switching at zero current results in the least disruption in current. Switching at non-zero current results in disruption in the current which is common known to cause decreases in efficiency, increases in noise, etc. For example, it is a common engineering principle that if the current flow through an inductor is suddenly stopped an increase in voltage would occur  $v = L(di/dt)$ . Clearly, in the invention of the King Patent this could lead to noise in the speaker S1. The fact of the matter is that for these reasons one of ordinary skill would not have switched the invention of the King Patent at non-zero current levels. Accordingly, since the selection of the timing is the selection of the result effective variable, i.e. how much noise is produced and determines the efficiency of the arrangement, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the timing of the King Patent so as to switch at zero current. As noted above the fact to switch at non-zero current is well-known to be avoided. Accordingly, having the various control signals timed so that zero current switching occurs does not present a patentable distinction over the claimed invention of the King Patent.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over King et al. 6,388,514 (King) in view of Grant 6,762,645 (Grant) as evidenced by Lincoln 6,072,362 (Lincoln) as applied to claims 21-23 and 39 above, and further in view of Bassett 4,959,764 (Bassett).

The reasoning as applied above in the rejection of claims 21-23 and 39 over King et al. 6,388,514 (King) in view of Grant 6,762,645 (Grant) as evidenced by Lincoln 6,072,362 (Lincoln) and the following: the power modulator section of King namely the circuit that includes elements like Q1 only has one single transistor connected to the primary of the transformer. Claim 24 recites that there are "switches" connected to the primary of the transformer. Figures 2 and 2A of Bassett shows that the use of two transistors connected to the primary of a transformer to make a power modulator is an art recognized equivalent to the use of but a single transistor.

Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have replace the single transistor power modulator of King with one that employs two transistors given the art recognized equivalents of these structures for forming power modulators as taught by Bassett.

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*Conclusion*

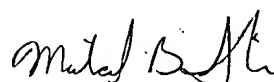
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Houpt US 3,202,923 discloses a bidirectional current amplifier that is similar in structure to applicant's invention except that it appears that no PWM controller is provided to both the power modulator section and the synchronous section.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. Shingleton whose telephone number is (571) 272-1770.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal, can be reached on (571) 272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MBS  
May 1, 2004

  
**MICHAEL B SHINGLETON**  
**PRIMARY EXAMINER**  
**GROUP 1 PART I INIT 5017**